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# Understanding, Prediction, and Control as Moderators of the Relationship between Work Conditions and Well-being

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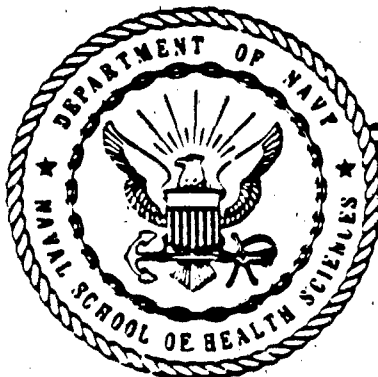
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Using a sample of physicians, dentists, and nurses (N=138), from a large naval medical hospital, the present study examined the conditioning effects of predictable, understandable and controllable work situations on the relationship between organizational conditions and various work and health outcomes such as job satisfaction, anxiety, and physical health status. The current study went beyond Sutton & Kahn's original proposal in two ways. First, it distinguished two types of control at work: control over ones own time and behavior (control-self) and control over the time and behavior of others (control-others). Second, it hypothesized and tested effects on health outcomes not proposed by Sutton and Kahn.

Hypotheses predicting moderating effects on the relationship between organization conditions and job attitudes were generally supported. Less support was found for hypotheses involving psychological and physical health as outcomes. However, specific exceptions were notable e.g., role ambiguity effects on psychological health was clearly and consistently moderated by understanding and control.

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UNDERSTANDING, PREDICTION, AND CONTROL AS  
MODERATORS OF THE RELATIONSHIP BETWEEN WORK  
CONDITIONS AND WELL-BEING

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Understanding, Prediction, and Control as  
Moderators of the Relationship between Work  
Conditions and Well-Being

INTRODUCTION

In a recent theoretical paper Sutton & Kahn (1983) hypothesized that

a given situational stress will create fewer adverse physical, psychological and behavioral responses when an organization member can: (1) predict its frequency, timing and duration; (2) understand how and why it came about and (3) exercise effective control over the stressor or other relevant stimuli in the work setting (p. 1).

The meta-theoretical framework for Sutton & Kahn's model is the general work stress/health model (e.g., Katz & Kahn 1978, House 1981) which postulates that objective work conditions can lead to work stress. Stressors, in turn, lead to job related strains such as dissatisfaction, boredom, and turnover, and individual strains such as anxiety, depression, and physical illness. In addition, the stress/health model hypothesizes that internal (i.e., personality) characteristics and external (i.e., situational) conditions not only have direct effects but conditioning or interactive effects as well.

Research involving the stress/health model has taken three general forms: (1) a demonstration that certain job conditions lead to adverse outcomes, e.g., role conflict leads to job dissatisfaction; (2) the demonstration of the direct effects of factors external to the work place on stress and strain (e.g., social support lessens role conflict and depression) or internal to the individual (e.g., type A behavior pattern increases role

conflict and anxiety level); and (3) the demonstration of the conditioning or interactive effects of these internal and external factors, e.g., social support reduces the relationship between role conflict and depression.

It is the investigation of these conditioning effects that has dominated most recent research. Of particular prominence has been the effort to demonstrate that social support reduces or buffers the relationship between stress and strain. There are numerous reviews of these studies, e.g., Cobb, 1976; House 1981. In general, one can conclude that social support from one's supervisor or coworker can buffer the relationship between work conditions and individual strains, but that social support is less likely to buffer the effects of work conditions on job-related strains (LaRocco, House, and French, 1980).

Social support is not the only potential mediator of stress/strain relationships. Most studies of other mediators, however, have focused on those referred to as internal (personality) characteristics, which may be difficult, if not impossible, to alter. A more effective and efficient approach would be to identify situational factors that are amenable to change. In work organizations, such factors can be altered through structural changes in the organization or amendments to management policy. While Sutton & Kahn do not cite this particular rationale for choosing the three moderators of organizational stress they propose as important, it seems an appropriate criterion in the search for useful antidotes to adverse organizational conditions.

### Model and Hypotheses

Figure 1 represents an adaptation of the theoretical framework described above. The numbered lines, (1, 2, 3), represent the hypothesized conditioning effects of understandability, predictability, and control. It is these hypothesized interactions that will be examined in this paper. Each number represents three hypotheses -- one each for the effects of understanding, prediction and control. Thus H1(UPC) symbolizes the interaction effects of understanding H1(U), prediction H1(P), and control H1(C) on the relationship between organizational conditions and job attitudes. Note that H2(UPC) hypothesizes that UP&C, respectively, moderate the relationship between organizational conditions and individual psychological and physical health. This set of hypotheses is not included in Sutton and Kahn's model. H3(UPC) specifies that the relationship between job attitudes and well-being is moderated by understanding, prediction and control.

The premise of the present study, in line with that of Sutton and Kahn, is that understandability, predictability, and control over events and behavior in one's work environment are important contributors to the relationship between the perception of and reaction to organizational conditions. In sum, the primary focus of this research is to assess the conditioning effects of understanding, prediction, and control on the relationship between organizational conditions, job-related attitudes, and individual psychological and physical health.

## METHOD

### Sample

The data were collected at a large naval hospital in the Northeast. Participants fell into three distinct groups: physicians (n = 52), dentists (n = 33) and nurses (n = 54). Demographic data for the three groups and the sample as a whole are shown in Table 1. On the average, the respondents were in their mid-thirties (the nurses being younger than the other groups), had been in their current job approximately 18 months and were mid-level officers. The majority of the sample were engaged primarily in clinical work as opposed to administration. The physicians and dentists were almost all male while the nurses were almost all female. Approximately half the nurses were married, while the physicians and dentists were almost all married.

### Data Collection

Participants were recruited through an announcement at staff meetings and by notes placed in a newssheet published daily at the hospital. Prospective participants assembled at the end of their work day (4-6 pm) in a designated room. They were then briefed on the study, and reviewed and signed a consent form if they agreed to voluntarily participate in the research. The participants then received the questionnaire and were instructed to return it the next day.



### Self-Report Measures

The self-report measures are grouped in accordance with the constructs constituting Figure 1. The number of items in each scale, alpha coefficients of reliability and sources from which the scales were adapted are noted in Table 2. Perceived organizational conditions included measures of quantitative workload, qualitative workload, responsibility for others, role ambiguity, and role conflict. Respondents indicated the extent on a (1) to (7) scale, to which each of these conditions was or was not present in their jobs.

Job-related attitude measures included overall job satisfaction, satisfaction with one's profession, satisfaction with the Navy, and a job-facet satisfaction measure which was a summation of six scales measuring satisfaction with security, pay, growth, co-workers, supervisors, and hours.

Finally, a work stressfulness (strain) scale measured the degree of strain resulting from several sources of stress common to health-care professionals (e.g., dealing with dying patients, passing boards, coping with the knowledge explosion).

Psychological health indicators included scales for anxiety, depression, somatic complaints, and self-esteem. Physical health indicators included perceived current health, resistance to illness, health expectations, and health worries.

The situational moderator variables included a scale for understanding of events at work, predictability of events at work, and two scales measuring control: control over ones own time and behavior on the job, called control-self (CS), and control over the time and behavior of others on the job, called control-others (CO).

#### Statistical Analysis

A stepwise hierarchal regression technique commonly used to test for conditioning effects was applied in the following manner. The effects of occupation were controlled for by forcing dummy variables representing occupation to enter first. Next, the exogenous variable was entered, followed by the moderator (second independent variable) and, in the last step, the multiplicative interaction term (independent variable x moderator) was entered. If the last term accounted for significant variance in the dependent variable, one could assume that the relationship between the independent and the dependent variable was moderated by the presence of the other independent variable.

The use of multiplicative interaction terms to represent moderating effects has been the focus of some discussion. In an excellent article on this subject Arnold (1982) points out that interaction terms allow one to speak of differences in the form of relationships brought about by the moderator variable, rather than differences in degree between two groups with different levels of the moderator variable. Arnold also points out that the multiplicative interaction term is more likely to lead to a type II error than other procedures. The implication of these

points is that, first, where significant interactions are found, the form of the relationship between the independent and dependent variable is being altered by the moderator variable. Second, the finding of a significant effect is important because the nature of multiplicative interaction analysis is to occasionally miss such effects when they are actually present. Since multiplicative terms represent a conservative indicator of interactions, a probability level of less than .10 has increasingly been accepted as an appropriate indicator of significance and was adopted here (cf. Thoits, 1982).

## RESULTS

### Hypotheses H1(UPC)

Hypotheses H1(UPC) stated that understanding, prediction and control moderate the relationship between organizational conditions and job-related attitudes. Table 3 summarizes the findings regarding H1(UPC).

H1(U). With one exception, understanding moderated the relationship between organizational conditions and at least one or more of the satisfaction measures. The only relationships not moderated at all by understanding were those involving role conflict. Understanding also moderated the relationship between responsibility for others and work strain.

H1(P). Predictability produced fewer significant interaction effects than understanding. The relationships between quantitative and qualitative workload and work strain, between quantitative workload and job satisfaction, and between qualitative workload and facet satisfaction were significantly

moderated by predictability of work events. These findings indicated that predictability can mitigate the adverse attitudinal consequences of heavy workloads.

H1(C). For quantitative workload, control-self, but not control-others, was a significant moderator when professional satisfaction or work strain was the dependent variable. On the other hand, for role ambiguity, only control-others was significant with professional satisfaction. For responsibility and role conflict, both control-others and control-self were significant moderators when facet satisfaction was the dependent variable. Control-self and control others were also significant moderators when the dependent variable was job satisfaction and the predictor variable was either responsibility or role ambiguity. A review of Table 3 would indicate that control was especially important as a moderator of the relationship between responsibility for others and job attitudes.

#### Hypotheses H2(UPC)

Hypotheses H2(UPC) predicted that understanding, prediction and control moderate the relationship between organizational conditions and psychological and physical health. The findings regarding these hypotheses are presented in two tables. Table 4 summarizes H2(UPC) for psychological health measures, while Table 5 summarizes H2(UPC) for physical health measures.

As indicated by Table 4, H2(UPC) was supported for only one organizational condition--role ambiguity. The single significant effect for quantitative workload and for role conflict will not be considered further. The key finding shown in Table 4 was the

importance of understanding and control in moderating the adverse relationships between role ambiguity and somatic complaints and self-esteem. Control-self and control-others also decreased the effect of role ambiguity on anxiety. Note, however, that the relationship with depression was not affected.

Turning to the physical health measures (Table 5), there is again only weak support for H2(UPC). Effects were scattered and inconsistent. Predictability seemed to have some effect on the relationship between role ambiguity and current health, resistance to illness, and future health expectations. Control-self weakly, but consistently, moderated the relationship between organizational conditions and health worries.

From Table 4 and 5, it would appear that, among the organizational conditions and health outcomes measured, the effects of role ambiguity were most susceptible to moderation by understandability, predictability and control.

#### Hypotheses H3(UPC)

Hypotheses H3(UPC) predicted that understanding, prediction, and control moderate the relationship between job-related attitudes and health outcomes. For the most part, hypotheses H3(UPC) were not supported. Among the psychological health variables (Table 6), understanding and control-others moderated the relationship between facet satisfaction and both anxiety and somatic complaints. Among the physical health measures (Table 7), the only strong and consistent finding involved work strain.

Control-self moderated the relationship between work strain and current health, resistance to illness and health expectations. In addition, predictability of events strongly reduced the relationship between work strain and health worries.

These data show that the effects of job strain on health status and concerns, to a limited extent, can be moderated by improving the understandability, predictability, and control of events and behavior at work. The effects of dissatisfaction with various facets of the work situation on anxiety and psychosomatic complaints also can be moderated by understanding and control of work events.

#### DISCUSSION

Within limits, this study provides credence to the Sutton and Kahn proposal that understanding, prediction and control can be "antidotes" to adverse work conditions. These moderators are particularly effective in reducing the negative effects of organizational conditions on job-related attitudes. The effects on the relationships between organizational conditions and health, and especially between job-related attitudes and health appear to be more limited. There were, however, notable exceptions to these findings. Specifically, the adverse effects of role ambiguity and work strain on health outcomes were consistently and impressively reduced by one or more of the three moderator variables.

Nevertheless, it appears that understanding, prediction and control may be most useful in buffering the effects of organizational conditions on job-related attitudes and strains.

and least effective when health outcomes are of concern. This finding, if substantiated, is intriguing because research on the buffering effect of social support has found just the opposite. That is, social support has been found to buffer the effects of organizational conditions on psychological and physical health, but it generally does not buffer these effects on job-related attitudes and strains (LaRocco et al, 1980). It would seem that an intervention program aimed at increasing understanding, prediction, and control, as well as social support, would provide a comprehensive assault on the adverse consequences of work conditions.

To date no one has addressed these differential effects or offered an explanation for them. One explanation may involve the principal of relevancy (French, Caplan and Harrison, 1982). The principal of relevancy holds that the strongest relationship between an independent and dependent variable occurs when both are measured on commensurate dimensions.

By extrapolation, one might hypothesize that moderator variables are likely to have more and greater effects to the extent that their conceptual dimensions are relevant to the independent and dependent variable whose relationship they are said to moderate. For example, social support, which is almost universally measured as socio-emotional in nature, more often moderates relationships involving socio-emotional outcomes e.g., anxiety, depression, and somatic complaints. Understanding, prediction and control, being job characteristics, appear to moderate, primarily, relationships involving other job characteristics and attitudes, i.e. those

relationships that are most relevant to understanding, prediction, and control of events at work.

Obviously, much more research needs to be done. Future inquiries should focus on improving the defining characteristics of understanding, prediction, and control. The distinction between two types of control (self and others) was one attempt at such a refinement. These two types of control were derived from a factor analysis of a larger pool of items pilot tested for use in this study. A third factor also appeared, however, which cut across the self-other dimension, and may be more important -- control or influence over decision making in the organization. Preliminary examination of the data has shown that influence over decision making also is a moderator of the relationships discussed in this report. This finding may support the research by Karasek (1978) on the relationship between job conditions and decision making latitude. More analysis is currently underway to examine this and other potential factors of interest.



#### Footnotes

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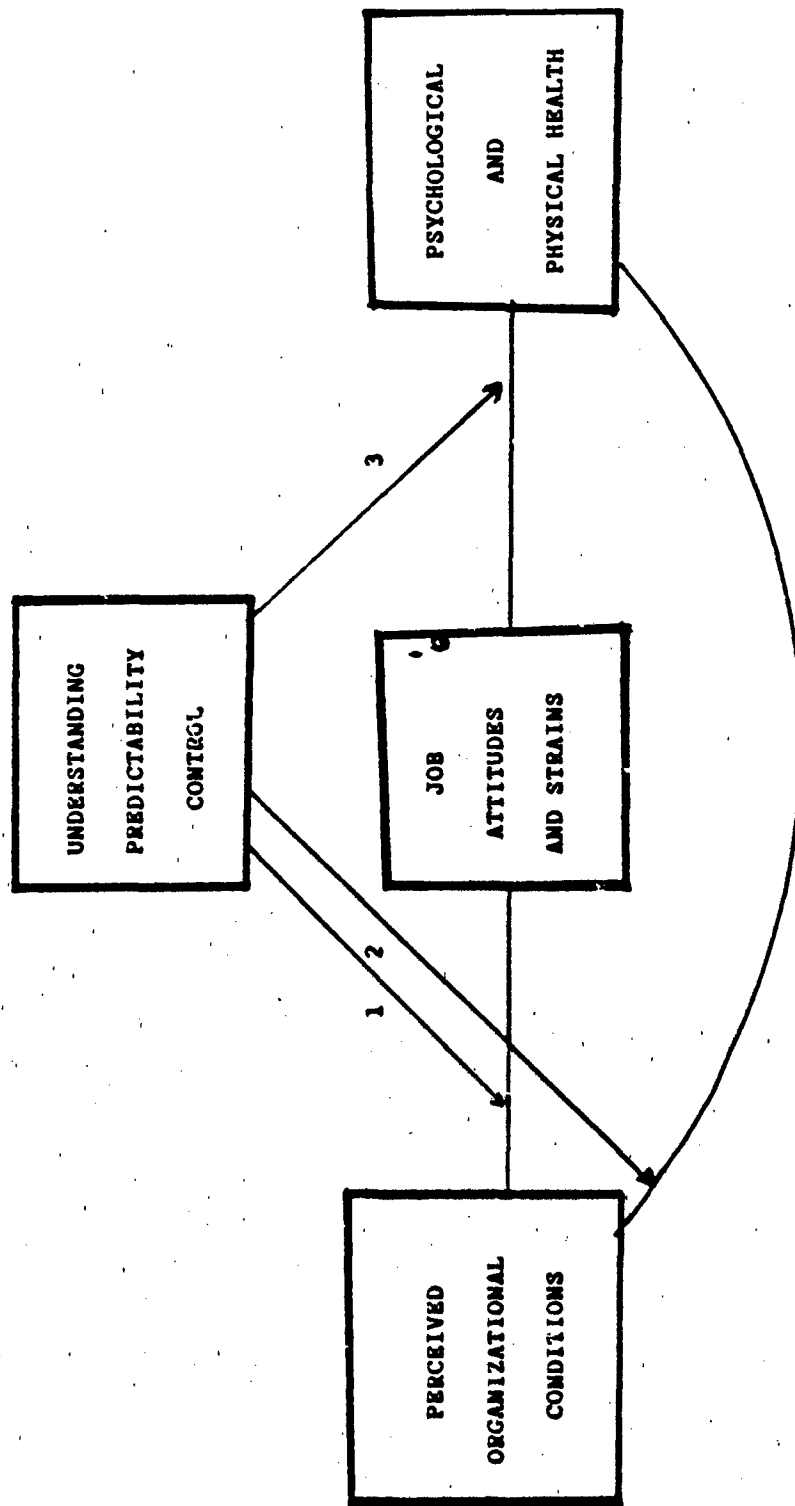


FIGURE 1 presents model of potential relationships among perceived organizational conditions, understandability, predictability, and control of work events, job attitudes and perceptions of psychological and physical health. The numbered lines represent the hypothesized conditioning effect of understandability, predictability and control.

TABLE 1

DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE  
(Mean (Standard Deviation) or Frequency (Percent))

Variable	Full Sample *	Dentists	Physicians	Nurses
N	139	33	52	54
Age	33.83 (6.41)	36.03 (5.56)	35.42 (6.32)	31.00 (6.04)
Sex				
Male	85 (61%)	32 (97%)	45 (87%)	8 (15%)
Female	54 (39%)	1 (3%)	7 (13%)	46 (85%)
Marital Status				
Single	37 (27%)	2 (6%)	8 (15%)	27 (50%)
Married	99 (72%)	30 (91%)	42 (81%)	27 (50%)
Divorced	2 (1%)	-	2 (4%)	-
Separated	-	1 (3%)	-	-
Tenure (in months)	15.75 (16.66)	13.27 (8.40)	21.67 (22.95)	11.56 (10.81)
Education				
RN	5 (3%)	-	-	5 (9%)
BA/BNS	36 (24%)	-	-	36 (67%)
MA	13 (9%)	-	-	13 (24%)
DDS	33 (22%)	33 (100%)	-	-
MD	52 (35%)	-	52 (100%)	-
Duties				
Clinical	95 (64%)	22 (67%)	43 (82%)	30 (56%)
Administrative	41 (27%)	9 (27%)	8 (15%)	24 (44%)
Academic	1 (1%)	1 (3%)	-	-

\* Some discrepancies exist due to missing values.

TABLE 2

## QUESTIONNAIRE MEASURES

<u>Measure</u>	<u>N of Items</u>	<u>Cronbach's</u>	<u>Range</u>	<u>Source</u>
Quantitative Workload	5	.75	(1) None or very little to (7) Very much; a great extent	House, J. S. (1980)
Qualitative Workload	3	.62	"	Developed for study
Responsibility for Others	4	.76	"	Caplan et al (1975)
Role Ambiguity	4	.64	"	"
Role Conflict	4	.68	"	House and Rizzo (1972)
Predictability of Events	4	.67	"	Developed for study based on Sutton and Kahn (1983)
Understanding of Events	4	.69	"	"
Control-Self	6	.83	"	"
Control-Others	4	.82	"	"
Work Strain	6	.74	(1) Not stressful to (5) Extremely stressful	Adams, J. A. (1980)
Global Job Satisfaction	3	.83	(1) Disagree strongly to (7) Agree strongly	Derived from the Job Diagnostic Survey (JDS) (Hackman and Oldham, 1980)
Job Facet Satisfaction	15	.85	"	"
Navy Satisfaction	3	.77	"	Developed to parallel the JDS global satisfaction measure.
Professional Satisfaction	3	.90	"	"
Anxiety	5	.83	(1) Rare/never to (5) Always	These scales are based on items adapted from a number of sources, primarily (Caplan et al, 1975)
Depression	7	.76	"	"
Somatic Complaints	5	.75	"	"

TABLE 2

## QUESTIONNAIRE MEASURES (continued)

Occupational Self-Esteem	4	.69	Semantic Differential format (1-6).	House, J. S. (1980)
Current Health	6	.88	(1) Definitely false to (2) Definitely true	Physical health items were taken from Rand Health Insurance Survey (Davis & Ware, 1981)
Resistance	4	.76	"	"
Health Worries	5	.70	"	"
Health Expectations	4	.66	"	"

TABLE 3: CONDITIONING EFFECTS OF UNDERSTANDABILITY, PREDICTABILITY AND CONTROL ON RELATIONSHIPS OF ORGANIZATIONAL CONDITIONS TO JOB ATTITUDES

INDEPENDENT VARIABLES	DEPENDENT (JOB-ATTITUDES) VARIABLES																	
	JOB SATISFACTION			PROFESSIONAL SATISFACTION			NAVY SATISFACTION			FACET SATISFACTION			WORK STRAIN					
	U <sup>a</sup>	P	CS	CO	U	P	CS	CO	U	P	CS	CO	U	P	CS	CO	U	P
	CONDITIONS																	
QUANTITATIVE WORKLOAD		.05			.05		.05		.10 <sup>b</sup>					.10	.05			
QUALITATIVE WORKLOAD					.10		.10	.10		.05				.10	.05			
RESPONSIBILITY FOR OTHERS	.05		.01	.10					.05	.01	.01	.05						
ROLE AMBIGUITY		.05	.05		.05		.05							.05				
ROLE CONFLICT										.01	.10							

U<sup>a</sup> = UNDERSTANDABILITY; P = PREDICTABILITY; CS = CONTROL-Self; CO = CONTROL-Others.

NUMBERS IN EACH CELL REPRESENT SIGNIFICANCE LEVELS (p) FOR INTERACTION EFFECTS.  
EMPTY CELLS INDICATE THE INTERACTION EFFECTS WERE NOT SIGNIFICANT.

TABLE 4  
CONDITIONING EFFECTS OF UNDERSTANDABILITY, PREDICTABILITY AND CONTROL ON RELATIONSHIPS OF ORGANIZATIONAL CONDITIONS TO PSYCHOLOGICAL WELL-BEING

DEPENDENT (PSYCHOLOGICAL WELL-BEING) VARIABLES

INDEPENDENT VARIABLES	ANXIETY			DEPRESSION			SOMATIC COMPLAINTS			SELF - ESTEEM		
ORGANIZATIONAL CONDITIONS	U <sup>a</sup>	P	CS CO	U	P	CS CO	U	P	CS CO	U	P	CS CO
QUANTITATIVE WORKLOAD												
QUALITATIVE WORKLOAD												
RESPONSIBILITY FOR OTHERS												
ROLE AMBIGUITY			.10 .05				.05 .10 .05 .05	.01	.01	.01	.01	.01
ROLE CONFLICT								.10				

U<sup>a</sup> = UNDERSTANDABILITY; P = PREDICTABILITY; CS = CONTROL-Self; CO = CONTROL-Others.

NUMBERS IN EACH CELL REPRESENT SIGNIFICANCE LEVELS (p) FOR INTERACTION EFFECTS.  
EMPTY CELLS INDICATE THE INTERACTION EFFECTS WERE NOT SIGNIFICANT.



TABLE 5: CONDITIONING EFFECTS OF UNDERSTANDABILITY, PREDICTABILITY AND CONTROL ON RELATIONSHIPS OF ORGANIZATIONAL CONDITIONS TO HEALTH PERCEPTIONS

INDEPENDENT VARIABLES	DEPENDENT (HEALTH PERCEPTIONS) VARIABLES											
	CURRENT HEALTH			RESISTANCE TO ILLNESS			HEALTH MORRIES			HEALTH EXPECTATIONS		
	U <sup>a</sup>	P	CS CO	U	P	CS CO	U	P	CS CO	U	P	CS CO
ORGANIZATIONAL CONDITIONS												
QUANTITATIVE WORKLOAD									.10			
QUALITATIVE WORKLOAD									.10			.10
RESPONSIBILITY FOR OTHERS			.05						.05			
ROLE AMBIGUITY		.05			.05			.05			.10	
ROLE CONFLICT												

U<sup>a</sup> = UNDERSTANDABILITY; P = PREDICTABILITY; CS = CONTROL-Self; CO = CONTROL-Others.

NUMBERS IN EACH CELL REPRESENT SIGNIFICANCE LEVELS (p) FOR INTERACTION EFFECTS. EMPTY CELLS INDICATE THE INTERACTION EFFECTS WERE NOT SIGNIFICANT.

TABLE 6: CONDITIONING EFFECTS OF UNDERSTANDABILITY, PREDICTABILITY AND CONTROL ON RELATIONSHIPS OF JOB ATTITUDES TO PSYCHOLOGICAL WELL-BEING

DEPENDENT (PSYCHOLOGICAL WELL-BEING) VARIABLES

INDEPENDENT VARIABLES	ANXIETY			DEPRESSION			SOMATIC COMPLAINTS			SELF ESTEEM		
	U <sup>a</sup>	P	CS	CO	U	P	CS	CO	U	P	CS	CO
JOB ATTITUDES												
JOB SATISFACTION												
PROFESSIONAL SATISFACTION												
NAVY SATISFACTION												
FACET SATISFACTION	.10						.05					
WORK STRAIN							.10					

U<sup>a</sup> = UNDERSTANDABILITY; P = PREDICTABILITY; CS = CONTROL-Self; CO = CONTROL-Others.

NUMBERS IN EACH CELL REPRESENT SIGNIFICANCE LEVELS (p) FOR INTERACTION EFFECTS.  
EMPTY CELLS INDICATE THE INTERACTION EFFECTS WERE NOT SIGNIFICANT.

TABLE 7: CONDITIONING EFFECTS OF UNDERSTANDABILITY, PREDICTABILITY AND CONTROL ON RELATIONSHIPS OF JOB ATTITUDES TO HEALTH PERCEPTIONS

INDEPENDENT VARIABLES	DEPENDENT (HEALTH PERCEPTION) VARIABLES											
	CURRENT HEALTH			RESISTANCE TO ILLNESS			HEALTH WORRIES			HEALTH EXPECTATIONS		
	U <sup>a</sup>	P	CS	CO	U	P	CS	CO	U	P	CS	CO
JOB ATTITUDES												
JOB SATISFACTION												
PROFESSIONAL SATISFACTION									.05			
NAVY SATISFACTION												.10
WORK STRAIN			.05		.10		.01				.05	

U<sup>a</sup> = UNDERSTANDABILITY; P = PREDICTABILITY; CS = CONTROL-Self; CO = CONTROL-Others.

NUMBERS IN EACH CELL REPRESENT SIGNIFICANCE LEVELS (p ) FOR INTERACTION EFFECTS.  
EMPTY CELLS INDICATE THE INTERACTION EFFECTS WERE NOT SIGNIFICANT.

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